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Centrifugal screeners double powder output

A US producer of powdered beverage mixes has boosted productivity and quality with a shift to Kason Centrifugal Screeners.

Federal regulations in the USA and consumer fears concerning allergens in food products prompted Compact Industries, a co-packer of powdered beverage mixes, to sanitise its processing equipment more frequently, and devise ways to more than compensate for the resulting sacrifice in productivity.

Founded in 1965, the company blends and packages powdered cocoa, cappuccino, spray- and freeze-dried coffees, smoothie mix, non-dairy creamers, punch mix and other powdered drink mixes that sell through retail and food service outlets under the Sun-Up, Ghirardelli and other brands. Compact’s marketing slogan, “If it’s powder, we can pack it,” is the guiding principle of the plant which operates two 10-hour shifts four days a week in a suburb of Chicago.

Screening after blending

“Matching powder consistency with product use is central to success in the powdered-beverage business,” explains Steve Metzger, Compact’s maintenance manager, adding, “Consistent powders are not only easier to package, they meet the expectations of consumers who do not want to open a pouch and find a clump. But if the powder is too fine, it’s going to float in water and take longer to dissolve.”

Maintaining tight particle size control with beverage powders is a challenge, however, due not only to foreign matter, but to sugars that agglomerate with friction, heat or moisture, and fats that tend to clump.

To remove these oversize particles, the company positions a screener below each of its nine blenders. These screeners were all horizontal-bed vibratory type units that barely kept pace with output requirements - until the increased wash-down protocols went into effect.

“Overall plant production was limited to the capacity of our screeners which were already at 100 percent utilisation,” says Metzger, “so the added downtime for sanitising incurred unacceptable losses in output.”

“Because bed screeners utilise vibration and gravity, separating oversize particles from on-size particles passing through the screen is a relatively slow process, and the finer the screen mesh, the slower the rate of screening,” he points out.

To overcome the bottleneck, the company replaced five of its nine horizontal-bed vibratory screeners with Centri-Sifter centrifugal sifters from Kason Corp. with each of the new screeners doubling the capacity of the one it replaced.
The centrifugal separator contains revolving helical paddles that accelerate and propel powders through the apertures of a horizontally-oriented, stationary cylindrical screen. The paddles do not contact the screen, but they propel oversize agglomerates and foreign particles through the open downstream end of the screen cylinder and eject them through a discharge spout.

“The design creates more dynamic sifting and helps break up agglomerated clumps,” says Larry Lindberg, Compact’s vice president of operations. “The way these units operate has significantly improved our ability to capture ‘overs’ – the particles and elements we want filtered out of the powder.”

Between production runs, the wedgewire basket and helical paddle assembly of the screeners are removed, allowing sanitising of the machine’s internal components and screening chamber interior.

**Blenders, sifters operate in concert**

All nine of the company’s blenders, which range in capacity from 794 to 3175 kg, are installed on the second floor of the plant. The centrifugal separators are connected to the bottom outlet of each blender at the ceiling level of the first floor. Each sifter discharges into a stainless steel hopper, and from there product feeds by gravity directly into packaging machine fillers. Lindberg says that throughput averages about 9,072 kg/h depending on the powder.

“We can use the same mesh screens in the separators for all of our blenders. That’s a big advantage,” says Metzger, explaining that the interchangeability means keeping fewer screen sizes on hand. “The No. 8 is the most common mesh size we use,” he notes, “so we have several of those. But we use the No. 4, No. 10 and No. 20 less often and keep just a spare of each.” He notes that the stainless wedgewire screening material of the Centri-Sifter units has proven able to handle heavier loads and to last longer than the nylon screening material of the bed-type vibratory separators.

Metzger adds that the cylindrical screen cylinders of the centrifugal units can be changed more quickly than can the flat screens of the vibratory separators. “It’s a matter of undoing a couple of clamps, opening the end bell and sliding the screen out,” he says. “It takes just a couple of minutes. Changing screens in the rectangular bed-style vibratory units requires many clamp rings to be removed. They’re stacked systems, so you’ve got to separate the whole assembly for cleaning.”
Four of the five centrifugal separators at Compact are "Quick-Clean" models that feature a hinged end cover and three-bearing shaft that cantilevers on two of those bearings when the overs discharge door is opened for cleaning, allowing internal components to slide freely from the shaft end.

Sifters endure rugged duty
Over the course of a production shift, Compact moves from the lightest flavors in its product line to the strongest to simplify between-product cleanings. "Our drink mixes have many ingredients in common, the primary differences being the proportions of primary ingredients and the addition of powdered flavors," says Metzger. "Between production runs of similar products we do a sugar wash, which means taking some clean sugar and distributing it around the blender to get any remnants of the previous batch out. The sugar is an abrasive and works well for this kind of simple cleaning."

Between production runs of products with significantly different flavor profiles, different colors, or - most importantly - different formulations that may contain a potential allergen, Metzger's crew gives the equipment a full wet washdown. The ease with which the screens of these separators can be removed for washdowns allows workers to focus on sanitation rather than on complicated disassembly. The units are fabricated to 2B sanitary finish with all welds continuous.

"What's hardest on screens is carelessness - how people handle them, and the heavy-duty wedge wire screen cylinders perform efficiently for up to two years. We've been getting good life out of them," he says.

With increasingly stringent food processing regulations incurring production setbacks, bringing an operation back up to speed as quickly as possible is critical to success. "The screening aspect of our operation is no longer a bottleneck, due to the increased capacity and cleanliness of our centrifugal screeners, particularly the quick-clean cantilevered shaft models," says Metzger.

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